



Dodge-Lummus Island Turning Basin Project Protecting Dolphins and Manatees During Underwater Blasting

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Background

In 1990, Congress authorized the deepening and expansion of the Port of Miami, Dade County, Florida. Part of that project included the deepening of the Dodge-Lummus Island Turning Basin. The Port of Miami had previously attempted to complete the project without blasting, but was unable to successfully do so, due to the presence of hard limestone. Because a population of bottlenose dolphins could be affected by the proposed blasting, the district submitted an application for an Incidental Harassment Authorization (IHA) in June of 2002. After a 30-day public review of the application, NOAA Fisheries issued an IHA to the district in May 2003. Due to project delays, the Corps applied for and was granted a renewal in April 2005. A key determination made by NOAA Fisheries was that marine mammals were unlikely to be harmed by the detonations, due to the district's conservative safety radius and extensive monitoring and mitigation measures, ensuring no dolphins, manatees or sea turtles would be within the blasting site nor its “buffer zone” when the detonations occurred.



Determining Impacts

- Size, type and depth of animal and explosive
- Depth of water
- Stand-off distance between animal and charge

Generally, potential impacts to marine mammals and reptiles from underwater blasting vary, based on mitigation methods employed before, during and after detonation. On one end of the spectrum, brief acoustic affects (temporary threshold shift), tactile perception, and physical discomfort could occur, and to the other end of the spectrum, non-lethal and lethal internal injuries to lungs, intestines and auditory system (ears) could occur.



Project History

- March 2002 – Corps determines dolphins may be affected by deepening of turning basin
- June 2002 – Corps submits application to NMFS under Section 101(a)(5)(d) of the MMPA
- May 2003 – NMFS issues authorization to Corps
- March 2004 – Corps applies for renewal of authorization
- April 2005 – NMFS issues renewal of authorization

Monitoring and Mitigation Measures



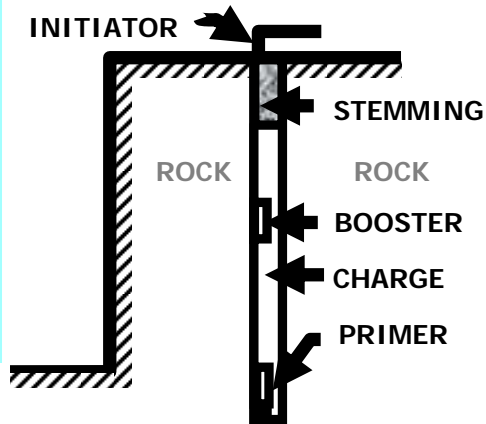
Unconfined blast



Confined Blast Image Series

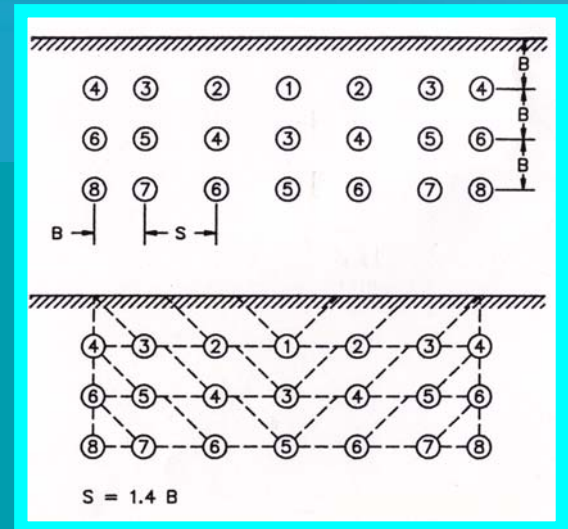
The series of images to the right provides an example of a confined blast in San Juan, Puerto Rico. Note the difference between the cone height in a confined blast versus the unconfined blast pictured to the left.

Using Confined Blasting



In confined blasting, the borehole (the hole in which the explosive material is placed) is capped with an inert material, such as crushed rock. This is referred to as “stemming the hole.” Studies have shown that stemmed blasts have a greater than 90% decrease in the strength of the pressure wave released, compared to unconfined blasts of the same charge weight.

- Lowest poundage of explosives necessary to adequately break rock based on test blast program
- No more than 2 blasts per day
- Blasting limited to daylight hours (2 hours after sunrise to 1 hour before sunset)
- Selection of explosive products and their practical application addressing vibration and air blast (overpressure) control for protection of existing structures and marine wildlife
- Drill patterns a minimum of 8 feet separation from a loaded hole



Examples of drill patterns

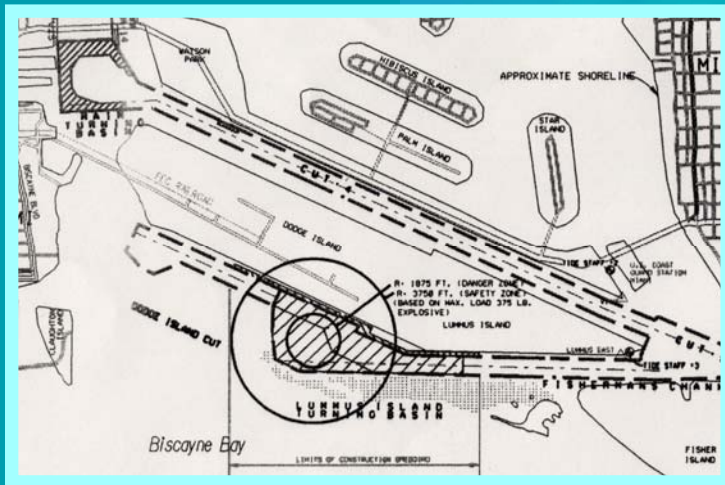
Observers and Monitoring

- Six observers trained in monitoring marine mammals and sea turtles; additional monitoring of building and structure vibration, acoustics and pressure will provide data on differences between confined and unconfined blasts
- Watch conducted at least 60 minutes before, during and 30 minutes after the time of each detonation
- Marine mammals and sea turtles in the predetermined area are not forced out of the area under any circumstances, but are monitored until they leave the area on their own
- Detonation will not occur if a marine mammal or sea turtle is known to be in the predetermined area.



A recording oscilloscope used to measure blast pressures.

Determining Safety, Danger & Watch Zones



Three zones will be delineated for each detonation using conservative methodology.

- Methodology used in Florida, North Carolina, New York and Puerto Rico since 1980s
- Loaded blast holes individually delayed to reduce the maximum pounds per delay at point detonation, reducing danger zone radius
- Based on U.S. Navy Dive Manual for an uncontrolled blast (unconfined) suspended in water column

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